

**A STUDY ON THE EFFECTIVENESS OF AEROBIC DANCE IN
REDUCING BODY FAT MASS AND INCREASING CARDIO
VASCULAR ENDURANCE**

*A dissertation submitted in partial fulfillment of the requirement
for the degree of*

**MASTER OF PHYSIOTHERAPY
ELECTIVE – SPORTS PHYSIOTHERAPY**



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RVS COLLEGE OF PHYSIOTHERAPY

(Affiliated to the Tamil Nadu Dr. M.G.R Medical University, Chennai – 32)

**SULUR, COIMBATORE – 641 402
TAMIL NADU
INDIA**

**A STUDY ON THE EFFECTIVENESS OF AEROBIC DANCE IN
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VASCULAR ENDURANCE**

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**SUBMITTED IN THE PARTIAL FULFILLMENT OF THE REQUIREMENT FOR
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INTERNAL EXAMINER

EXTERNAL EXAMINER

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DECLARATION

I hereby declare and present my project work entitled “**A STUDY ON THE EFFECTIVENESS OF AEROBIC DANCE IN REDUCING BODY FAT MASS AND INCREASING CARDIO VASCULAR ENDURANCE**”.

The outcome of the original research work undertaken and carried out by me, under the guidance of Associate Professor, **MR. FRANKLIN SHAJU MPT.,RVS COLLEGE OF PHYSIOTHERAPY**, Sulur, Coimbatore.

I also declare that the material of this project work has not formed in any way the basis for the award of any other degree previously from the Tamil Nadu Dr. M.G.R Medical University.

SIGNATURE

ACKNOWLEDGEMENT

I give my thanks to God almighty for providing me the wisdom and knowledge to complete my study successfully.

I acknowledge my sincere thanks to **CHAIRMAN and SECRETARY OF RVS EDUCATIONAL TRUST**, Sulur, Coimbatore for providing the opportunity to pursue my Post graduation studies in their esteemed institution.

I would like to thank my guide, **MR. FRANKLIN SHAJU, MPT** offering me perceptive inputs and guiding me entirely through the course of my work and without his tired less guidance and support this project would not have come through.

I offer my grateful thanks for all the staff members of physiotherapy rehabilitation centre.

I also thank my friends for their co-operation in completion of this project.

I offer my thanks and gratitude to our librarians for their supports in providing books to complete my study.

I take this golden opportunity to thank each and every patient who took part in this study for their kind co-operation and needed information.

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I. INTRODUCTION

“Health is Wealth”, as defined by world health organization (WHO), Health is defined as complete physical, mental and social well being and not merely the absence of disease or infirmity. When talking about physically fit this is defined as “a set of attributes that people have or achieve that relates to the ability to perform physical activity”

This physical fitness is made up of five components,

- Cardio vascular Endurance
- Muscular strength
- Muscular Endurance
- Flexibility
- Body Composition

When these five components are good, the person is said to be physically fit.

In this competitive world, people have to work hard to compete for their well being. They has to sacrifice many things such as proper food, physical activities, their healthy entertainments etc. In such list, the major component is personal care is nor cared properly leading to illness or making him physically unfit.

Examples are the IT professionals spend most of their precious time sitting in the desk top. This eventually decreases their physical activity level and making them to lead a sedentary life cycle. Advanced motor transport system has made people to forget the bicycle and walking to more to very nearer places even, this literally reduces the endurance level both in cardiac system and in muscular system.

When the cardiac endurance is decreased, the health function seems to be slow. This endurance is not only reduced by decrease in physical activity but also through the habits of smoking is major devil in decreasing the cardio vascular function. Apart from these things the current environment we live also the major cause for creating cardio vascular complications, the polluted air we inhale also have the same effect as smoking do so in our lungs and heart.

When these factors have such effect on our cardio vascular system, the function is getting reduced. When these professionals work hard mentally, the brain must have good circulation to work effectively. The reduced cardio vascular function affects the normal circulation leading to mental stress and tension, automatically affecting mental fitness.

Talking next to physical activities the diet we consume nowadays is worst that we consume earlier. In this fast life fast food as got its significance in everyone's daily food. Junk foods are tasty but of no nutritive value. Balanced diet has got its name only in the history of diet but not in our day to day diet pattern. When nutritive food is not consumed properly, the improper food pattern may alter the normal metabolism. When the normal metabolism is altered the basal metabolic rate of an individual (BMR) will also get altered.

Lack of physical activity and improper diet will all lead to many ill effects. One such ill effect is obesity. When non nutritive valued food is consumed many unwanted calories gets stored as fat in our body. When excess fat is stored they will also become a factor in reducing their physical activity further, leading to excessive storage of fat and at last obesity results.

When talking about excess body fat the outcomes will be

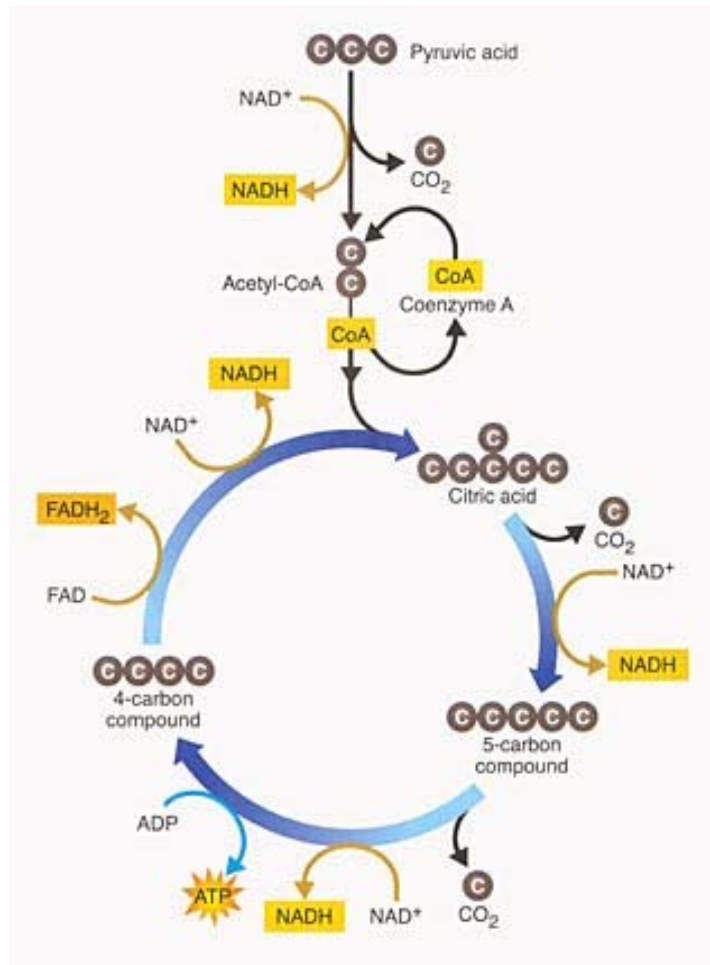
- Increased fat mass ultimately leads to overweight
- Loss of cardiac endurance
- Cosmetically bad figure
- Unable to do certain day to day activities like squatting, climbing stairs and even standing for long time,

The medical effects of excess fat mass are,

- Early degeneration of joints especially weight bearing joints,
- Heart disease,
- Wheezing,
- Stroke
- Fat embolism etc.

Considering all such factors physical activities or exercises prevents all the risk factors in our life. Exercise is one such method in reducing fat and increasing cardiac endurance. Exercise may vary from mild jogging, walking, free hand exercises, gymming etc

Krebs Cycle-Fat Metabolism



Fat can be reduced through exercise when they are oxidized. Fat oxidation is carried out through aerobic exercise, since fat required lots of oxygen for oxidation.

AEROBIC DANCE:-

Aerobics, the term and the specific exercise pattern were developed by Kenneth. H. Cooper, an exercise physiologist and Col. Pauline Potts, a physical therapist. This is a sequence of movements that mostly work on all most all the body parts. This ultimately makes the human body to starve for energy.

A wonderful exercise regimen that provides multiple benefits to the participant is aerobics. These benefits include the burning of calories, possible weight-loss or maintaining weight, and a cardiovascular workout that stimulates the heart and lungs.

Another benefit of aerobics may include the combined component of listening to music. Combining music with exercise provides a wonderful stimulus and enjoyment in performing the exercise. Also, countless aerobic classes are comprised of many exercise enthusiasts. The benefits of exercising with others provide motivation and accountability in maintaining the exercise program.

Before beginning an aerobic dance step workout, you probably have had the opportunity to witness classes that were being conducted at your fitness center or possibly at your church. You may have been impressed with the high levels of energy and the coordination of those who were performing aerobic dance steps. You may have even felt a little intimidated. However, it is important to remember that everyone in the class was, at one point in time, at the same level that you are at now in beginning the aerobic dance step class.

Above the music in an aerobic dance step class, the leader will be shouting out instructions to the class. The instructor will be leading the group, shouting out instructions to the class and will be using the words left and right. These refer to either the left or right arm or leg. The best advice in learning the aerobic dance steps is to ignore the commands, at first from the instructor, and simply imitate their lead.

Aerobic dance step patterns are usually measured in beats. These beats, per minute, usually total 32 or 64. However, it is important again not to worry about counting the total beats, but simply follow the lead of the instructor. Generally, in keeping time, the only counting that needs to be done is in intervals of four and eight. This is because the entire dance step segment falls into either one of these counts. A typical aerobic dance step segment is performed in four or eight counts and is then followed with a separate segment using four or eight counts. Ultimately the steps will add up to 32 or 64.

In addition to dance steps, the routine may eventually call for arm movements. These arm movements are added to the mix to increase the heart rate. Remember it is important to feel comfortable with the basic aerobic dance steps and then add other movements at your own pace.

An aerobics workout should raise your heartbeat for an extended period of time. They say that you should continue your aerobic workout for at least twenty minutes. It's at this point that your body starts to use your excess fat for energy. The great part is that aerobics workouts don't have to be tedious and they don't have to be the same thing day after day. One of the best ways to keep up with your aerobics workout is to find several workouts that you can mix out throughout the week or month. That way, your workout never becomes stale and you won't get burned out.

For anyone who has ever worked out with a step machine, you know the advantages in the stepping motion to your leg and buttock muscles. Using an aerobics step bench in your workouts will intensify your work on these muscles so that you can achieve greater results in less time. While the impact of stepping is not necessarily low impact, it is easier on your joints than other activities such as running or walking regularly. To help with shock absorption, make sure you always use your aerobics step bench with appropriate shoes; your sneakers should be lightweight but offer plenty of support.

You should also make sure to wear proper clothing; remember, it is aerobic activity designed to raise your heart rate and burn fat, so lightweight clothing is best. Have a water bottle handy, and use it regularly during breaks in the workout. Be aware of your posture throughout your workout to maximize your benefits and decrease your chances of putting any sort of strain on your lower back.

Aerobic exercise is a physical exercise that is closely associated with anaerobic exercises and, because they use oxygen to let the muscle generate energy, aerobic exercises include all types of exercising but are concentrated mainly on those that are performed at levels of intensity that may be described as being moderate and for extended lengths of time.

Aerobic exercise will help to maintain a higher heart rate and the oxygen is used to burn the fats and glucose to produce adenosine triphosphate, which is the carrier of basic energy for each and every cell. At the beginning of aerobic exercises, glycogen gets broken down in order to produce glucose but if there is no glucose present, it would result in fat beginning to decompose. The decomposition of fat is a process that takes its time and also result in performance levels going down. When the body starts to use fat as a fuel, it causes what marathon runners call hitting the wall.

The sequences of movements that are usually choreographed are

- Hops , upward reaches,
- Abdomen crunches
- Jogging in place, Jumping jacks
- Rocking side to side, Alternate shoulder shrugs
- Opposite elbow to knee, Tri kick backs
- Alternate knee lifts, Back extensions
- Forward and backward kicks

FIG 1 : AEROBIC DANCE STEPS

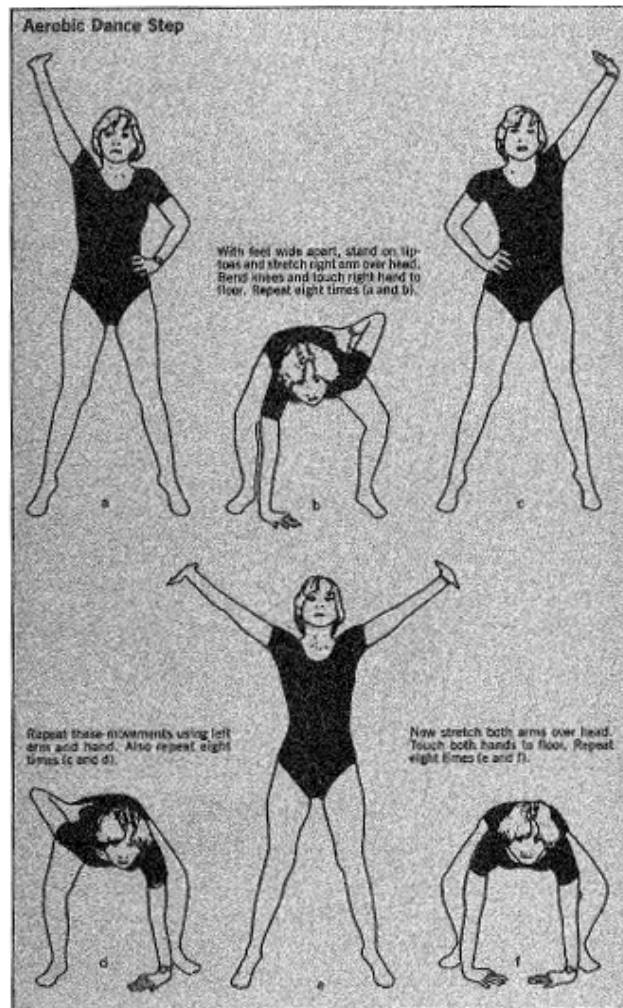


FIG 2 PIC SHOWING ONE AEROBIC DANCE SESSION



Statement of the study:

The study on the effectiveness of aerobic dance in reducing body fat mass and improving cardio vascular endurance.

Need for study:

To create awareness among the public about the physical fitness.

To create awareness about the ill effects of excess body fat mass.

To inform the public, dance as the best form of cardiac exercise.

To give an idea about the impact of aerobic dance in reducing body fat mass and improving cardiac endurance.

To give proper knowledge to the gym instructors and aerobic trainers about the effect of aerobic dance.

Hypothesis:

Null hypothesis:

There is no significant difference in body fat mass and cardio vascular endurance following aerobic dance

Alternate hypothesis:

There is significant difference in body fat mass and cardio vascular endurance following aerobic dance

OPERATIONAL DEFINITIONS

Aerobic dance

It is a form of physical Exercise that combines rhythmic body movements with stretching and strengthening routines with the goal of improving flexibility, muscular endurance, strength and cardiac endurance.

Cardiac Endurance:-

It is the efficiency of the heart, lungs and vascular systems in delivering oxygen to the working tissues so that the prolonged physical work can be maintained.

Body Fat mass:

The amount of fat present in the human body

II. REVIEW OF LITERATURE

1. Kriketos AD, Sharp TA, Seagle HM, Peters JC, Hill JO.

In their study of the effectiveness of aerobic fitness on fat oxidation and cardiac endurance, 24hours fat oxidation is positively related to body fat mass and negatively related to VO₂max. This study is carried out for centre for human nutrition, university of Colorado health sciences centre, Denver 80262, USA. The study was carried out in 24 male subjects under sedentary conditions.

2. Suzuki S, Urata G, Ishida Y, Kanehisa H, Yamamura M

For the department of molecular life science in Tokai university school of medicine, The study was to investigate the influences of aerobic training on the body composition, aerobic power in young females in relation to the initial levels of these variables.

3. Scharhas-Rosenberger F, meyer T, Walitzek S, Kindermann W, in 2007 April

University of Saarland, Institute of sports preventive medicine. Saarbruckern , Germany fried erike. The study has shown results in fat oxidation in previously untrained men and women following one year of aerobic training.

4. Talanian JL, Galloway S.D, Heighhauser GJ, Boven A, Spriet L.L.

2006 dec 14

For the department of human health and nutritional sciences, University of Guelph has done the study high intensity aerobic effect which increase the capacity of fat oxidation in women. The conclusion in seven sessions of HIIT in aerobics have increased fatty acid oxidation.

5. Waynemiller et all in 1997

Tested the aerobic dance effect on fat loss, The study was carried out in George Washington University medical centre, and concluded that fat loss benefit is of marginal effect.

6. Journal of applied research, Sep1,2008,

Petrosky, Jerrold, Jennifer berk, Lee, Collins, Kelly Yary have the effect on the study on aerobic dance effect on cardiovascular fitness and body composition.

7. European Journal of sports medicine Aug 2001,

Forte, Roberta, De vito, Murphy all gave the result of cardio vascular response in step aerobic dance in middle aged subjects. PFT values are taken as variables.

8. David R, Hopkins, Bettly Murrah, 1990

They have shown the effect of low impact aerobic dance on functional fitness of elderly women including cardio respiratory endurance, body fat, and balance etc.

9. Damel S, Rooks Carohne B, silverman, 7Feb 2002

They published the effects of progressive strength training and aerobic exercise on muscle strength and cardio vascular fitness in women.

10. Linda M, Lemina, Serge P. Von Duvillard, Todi M, Klebez April 2000

For the journal of European journal of applied physiology has published about the effect of aerobic training in reducing fat mass and cardio vascular fitness, and the positive effect have been approved.

11.Low impact aerobic dance as a useful exercise mode for reducing body mass in mildly obese middle-aged women.

Shimamoto H, Adachi Y, Takahashi M, Tanaka K. 1998 May;17(3):109-14

Faculty of Sport and Health Science, Fukuoka University.

Aerobic power such as maximal oxygen uptake and oxygen uptake corresponding to lactate threshold significantly increased ($P < 0.05$) in both groups. Significant difference in the alterations in these variables between groups could not be seen. The data of this study indicates that our weight-loss program with a low impact aerobic dance is as useful as jogging or cycling in improving body composition and aerobic power for mildly obese middle-aged women.

12.The physiological effects of aerobic dance.A review.

Williford HN, Scharff-Olson M, Blessing DL. 1989 Dec;8(6):335-45

Auburn University, Montgomery, Alabama.

Abstract

Aerobic dance exercise is currently one of the most commonly practised adult fitness activities. The majority of the research pertaining to this form of exercise supports its application as a valid cardiovascular training alternative, especially for adult females if performed according to the American College of Sports Medicine (ACSM) guidelines.

If, however, the participant is interested in modifying body composition, training frequency, duration, or efforts toward caloric restriction may need to be increased .

13.Dance--a suitable form of exercise? A physiological appraisal.1984

Dec 8;66(23):883-8

Pepper MS.

This review considers the physiological demands and effects resulting from various dance forms and describes the unique alterations in body build and composition, musculo-skeletal and cardiovascular adaptations,

1978 Oct 20;39(4):277-82.

14.Maximal oxygen intake and body composition of female dancers.

Novak LP, Magill LA, Schutte JE.

Maximal oxygen intake was higher in dancers when expressed in relative terms. Dancers had also significantly lower total body fat. In conclusion, it seems tha, dance with all the variations, should be encouraged for maintenance of physical fitness and ideal weight.

15. Physiological aspects of dance.

Clin Sports Med. 1983 Nov;2(3):525-37.

Kirkendall DT, Calabrese LH.

Abstract

Improvement in cardiovascular fitness is related to the mode, frequency, duration, intensity, and rate of progression of exercise. These data suggest that dance as an activity for promoting fitness will improve aerobic and physical working capacity. The commercial classes studied were of short duration and relied on elevated intensity for improvement, whereas the classes for professional dancers were low in intensity and relied on frequency and duration for improvements. Other areas studied were body composition and strength.

16. The effect of endurance training on parameters of aerobic fitness.

Sports Med. 2000 Jun;29(6):373-86.

Jones AM, Carter H.

Department of Exercise and Sport Science, Crewe and Alsager Faculty, The Manchester Metropolitan University, England. A.M.Jones@mmu.ac.uk

This review considers the effect of endurance training on the key parameters of aerobic (endurance) fitness and attempts to relate these changes to the adaptations seen in the body's physiological systems with training.

The importance of improvements in the aerobic fitness parameters to the enhancement of endurance performance is highlighted, as are the training methods that may be considered optimal for facilitating such improvements.

17. Effects of 12 weeks of aerobic exercise plus dietary restriction on body composition, resting energy expenditure and aerobic fitness in mildly obese middle-aged women.

Eur J Appl Physiol Occup Physiol. 1994;68(3):258-65.

Shinkai S, Watanabe S, Kurokawa Y, Torii J, Asai H, Shephard RJ.

Department of Hygiene and Public Health, Ehime University School of Medicine, Japan.

This study investigated the effects of 12 weeks of aerobic exercise plus voluntary food restriction on the body composition, resting metabolic rate (RMR) and aerobic fitness of mildly obese middle-aged women

18. Influence of exercise training on physiological and performance changes with weight loss in men. Med Sci Sports Exerc. 1999 Sep;31(9):1320-9.

Kraemer WJ, Volek JS, Clark KL, Gordon SE, Puhl SM, Koziris LP, McBride JM, Triplett-McBride NT, Putukian M, Newton RU, Häkkinen K, Bush JA, Sebastianelli WJ.

Aerobic and resistance exercise prevents the normal decline in fat-free mass and muscular power and augments body composition, maximal strength, and maximum oxygen consumption compared with weight-loss induced by diet alone.

III. RESEARCH DESIGN AND METHODOLOGY

Research Design:-

- Descriptive Study

Research Setting

- Figure in Fitness gym, Tirupur.

Inclusion criteria

- Females of Age group 19 to 25 years
- Body fat mass above 15 Kg.

Exclusion criteria

- Extremely obese females
- Females with cardio pulmonary complications
- Lower limb pathology
- Disc problems

Sample Population

- 30 members

Variables used in study

Independent variable

- Aerobic Dance

Dependent Variable

- Body fat mass
- Cardiac endurance (total body vo2)

METHODOLOGY

The samples selected are pretested for their cardiac endurance and Body fat mass. Cardiac endurance is tested through finding the total body vo2.

METHOD TO FIND TOTAL BODY VO2:

It is the product of body weight and vo2 max.

Method to find VO₂ max:

The Vo₂ max is calculated using 12 min treadmill test. The subject is given 12 mins and asked to run in the treadmill with his/her comfortable speed. The distance he covered is taken then the Vo₂ max is calculated using the formula.

$$\text{Vo}_2 \text{ max} = \frac{0.2 \times \text{Distance Covered in mts}}{12} + 3.5 \text{ml of O}_2/\text{kg}/\text{min}$$

Method to find Body fat Mass:

BCA machine, ie., Body Composition Analyzer is a machine that detects the body fat content, muscle mass BMR, water content etc, the input must be our height, weight, age etc., the output received show us the BMI, BFM and other details, the body fat mass is taken from the output and is tabulated.

The subjects are intervened with Aerobic dance for 3 weeks, 4 days in a week, ie. totally 12 days of Aerobics.

Then the subjects are post tested with the same method, then the post test values are tabulated.

Precautions for testing with In Body analysis

Anyone who has an implantable electrical device such as Pacemaker, Defibrillator, Nerve Stimulator, or women within the first twelve weeks of pregnancy is recommended not to use the device.

Things to keep in mind for the accurate measurement with In Body 230

1. Preferably the test should be carried out on an empty stomach & bladder
2. Testing should be carried out before exercise.
3. Testing should not be carried out after a shower or using a sauna as sweat & heat causes a temporary change in conductivity within the body
4. Subsequent testing should be carried out under similar conditions. (i.e. similar clothing, testing time, before eating or exercising etc.)
5. Height needs to be inputted accurately as it will effect the measurement.
6. Arms need to be away from the side of the body. Not touching body

METHOD OF AEROBIC DANCING

Aerobic exercise is a physical exercise that is closely associated with anaerobic exercises and, because they use oxygen to let the muscle generate energy, aerobic exercises include all types of exercising but are concentrated mainly on those that are performed at levels of intensity that may be described as being moderate and for extended lengths of time.

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You should also make sure to wear proper clothing; remember, it is aerobic activity designed to raise your heart rate and burn fat, so lightweight clothing is best. Have a water bottle handy, and use it regularly during breaks in the workout. Be aware of your posture throughout your workout to maximize your benefits and decrease your chances of putting any sort of strain on your lower back.

The sequences of movements that are usually choreographed are

- Hops , upward reaches,
- Abdomen crunches
- Jogging in place, Jumping jacks
- Rocking side to side, Alternate shoulder shrugs
- Opposite elbow to knee, Tri kick backs
- Alternate knee lifts, Back extensions
- Forward and backward kicks

MATERIALS USED:

MEASURING TOOL:

- Total body vo2
- Body fat mass

Tools used:

- Treadmill (precor)
- BCA machine (In body 230)

IV. DATA ANALYSIS AND INTERPRETATION

The data collected was subjected to paired 't' test; using the following formulae:

$$\bar{d} = \sum d/n$$

Where,

d=difference between pre test and post test values

\bar{d} is the mean value of d

n= is the number of subjects

$$\text{Standard deviation SD} = \frac{\sqrt{\sum d^2 - \frac{(\sum d)^2}{n}}}{n - 1}$$

$$t = \frac{\bar{d}\sqrt{n}}{S}$$

Table 1

The tabulated pretest and post test values of total body VO_2

S.no	Pre Test	Post Test
1	1.28	1.38
2	1.47	1.86
3	1.36	2.21
4	2.04	1.72
5	1.65	2.05
6	1.91	2.0
7	1.87	1.34
8	1.06	2.13
9	2.06	2.24
10	1.60	2.92
11	2.43	3.19
12	2.68	1.9
13	1.52	1.83
14	1.46	1.78
15	2.02	2.22

S.No	Pre Test	Post Test
16	2.40	2.73
17	1.43	1.93
18	2.30	2.44
19	1.70	2.16
20	1.70	2.02
21	1.45	1.85
22	1.27	1.51
23	1.26	1.68
24	1.44	1.84
25	1.31	1.53
26	1.85	2.16
27	1.53	2.10
28	1.29	1.74
29	2.75	3.10
30	1.31	1.45

Table 2 The tabulated pretest and post test values of Body Fat Mass

S.No	Pre Test	Post Test
1	23.8	21.2
2	23.5	21.2
3	32.2	30
4	34.4	32.1
5	29.3	27.1
6	22.6	21.3
7	30.8	29.1
8	28.8	26.4
9	19.2	15.3
10	25	23.7
11	24.3	22.5
12	22.5	20.1
13	25.7	23.4
14	26.8	25.2
15	24.7	23.2

S.No	Pre Test	Post Test
16	25.7	24.6
17	26	24
18	23.8	21.1
19	25.6	23.2
20	28.1	26.8
21	32.6	30
22	34.8	32.1
23	35	32.6
24	34	31
25	30.1	28.8
26	25.7	23.2
27	28.6	25
28	30.2	28.8
29	32.8	31
30	30.5	28.5

TABLE – 3

S.No	Variable	Improvement		SD	Paired 't' Value
	Total Body Vo2	Mean	Mean Difference		
1	pre Test	1.71	0.32	0.12	14.61
2	post test	2.03			

In paired 't' test the calculated 't' value is 14.61 and the t table value is 3.66 at 0.001 level, thus the above value shows that there is significant difference between present and post test values, ie., there is significant difference in total body vo2 aerobic dance.

Figure 3

Graphical representation of the pre and post test values of total body v_{O_2}

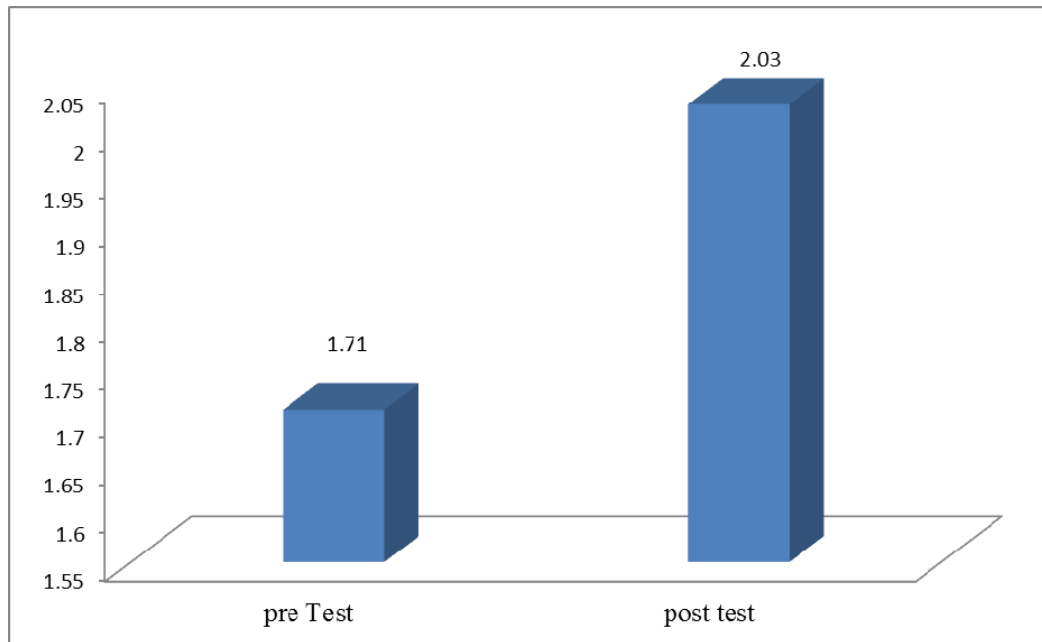


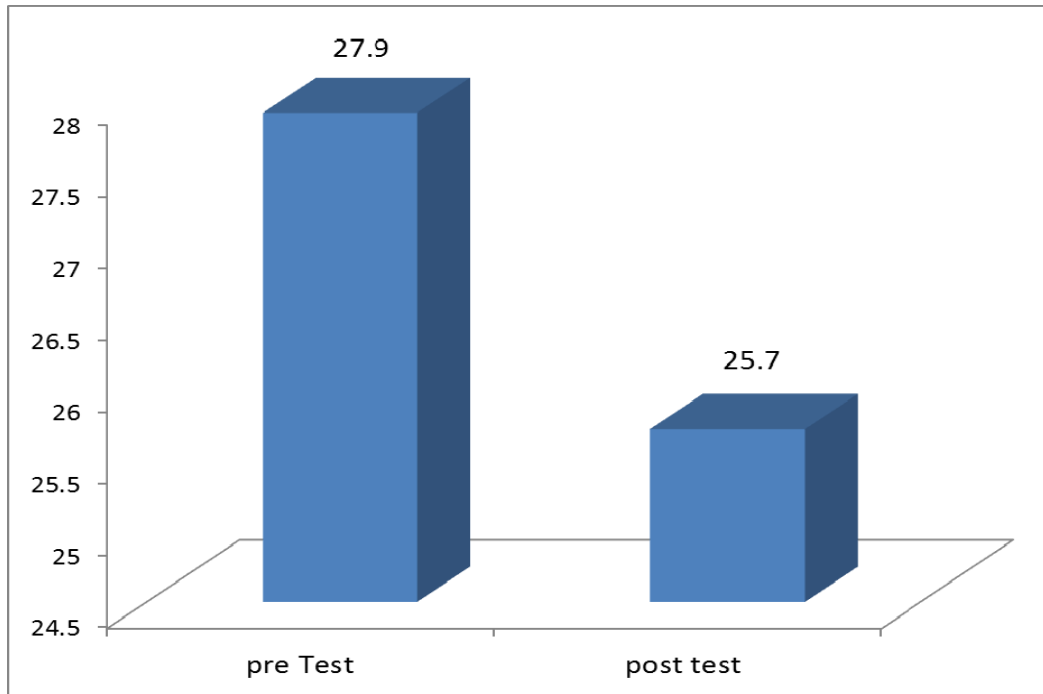
TABLE – 4

S.No	Variable	Improvement		SD	Paired 't' Value
	Body Fat MASS	Mean	Mean Difference		
1	pre Test	27.9	2.2	2.09	5.75
2	post test	25.7			

In paired 't' test the calculated 't' value is 5.75 and the t table value is 3.66 at 0.001 level, thus the above value shows that there is significant difference between present and post test values, ie., there is significant difference in Body Fat Mass following aerobic dance.

Figure 4

Graphical representation of the pre and post test values of Body Fat Mass



IV. RESULTS

Results

The study is done with 30 subjects testing their body Fat Mass and cardiac endurance, they are given aerobic classes for 3 weeks with 4 days / week, they all have developed cardiac endurance and decreased in body Fat Mass.

The calculated paired t values are 5.75 for Body Fat Mass and 14.61 for total body vo2 and the t table value is 3.66 values at 0.001 levels. Since the calculated t value is more than the t table value, there is significant change in body fat mass and cardiac endurance following aerobic dance thereby we are going to accept alternate hypothesis and reject null hypothesis.

VI.SUGGESTIONS AND LIMITATIONS

SUGGESTIONS FOR FURTHER RESEARCH:

- Skin fold test can be used instead of BFA
- No of subjects can be increased
- Study can be done in males
- Instead of aerobic dance any other aerobic activity can be used
- The dependent variable can be changed to muscular endurance concentrating a single muscle group.

LIMITATIONS

- Subjects who have cardio vascular complications may alter the results
- The study with weight loss diet pattern can alter the results
- Classes with large crowd can alter the result
- Classes with short duration may give negligible results
- Subjects who are not regular to classes will not give proper results
- Subjects who are regular dancers over a year may give negligible results

VII.DISCUSSION

Relating aerobic exercises and cardiac endurance many studies have been done. Krikitos. A. D, Sharp T.A, in their study, aerobic fitness effects on fat oxidation and cardiac endurance stated that fat oxidation is positively related to fat mass and negatively related to vo2 max. like wise in this study aerobic dance decreases the body fat mass and increases the cardiac endurance.

Most of the endurance studies are done on male subjects. studies done on female subjects have shown significant results similar to what happen in my study. All the 10 female subjects have shown significant difference in both body fat mass and cardiac endurance.

TalanianJI, Galloway studied on high intensity aerobics which increases the rate of fat oxidation in just 7 sessions. But our study was carried out for 12 sessions and hence the result has come positively.

Based on the physiological effects of aerobic dance, the study has been carried out and the result is aerobic dance has significant effect on fat loss and cardiac endurance.

VIII. CONCLUSION

The study was carried out in 30 subjects. They were given aerobic dance for 3 weeks. They were pre and post tested for body fat mass and vo2 max. The results were calculated using paired t test. The resulting t values show that there is significant increase in cardiac endurance and reduction in body fat mass following aerobic dance.

And I conclude the study as aerobic dance has significant effect in the reduction of body fat mass and increasing cardiac endurance.

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FIG 4 PRECOR TREADMILL USED FOR TESTING TOTAL BODY VO₂



FIGURE 5

ONE OF THE SUBJECTS RUNNING IN TREADMILL FOR TESTING TOTAL BODY VO₂



Appendix

Technology used in measuring body fat mass using BCA machine

In Body's new technology has led to an amazing increase in accuracy & reproducibility and ended the misconception that BIA is inaccurate.

Direct Segmental Multi-frequency Bioelectrical Impedance Analysis (DSM-BIA) acknowledged by patents worldwide.

Direct Segmental Multi-frequency Bioelectrical Impedance Analysis (DSM-BIA) separately measures the impedance of the trunk, arms, and legs of our body.

It separates the flows of currents and electric potential. This new measurement concept measures the resistance at the cross point of two flows and takes the resistance values of the arms, legs and the body trunk.

Conventional equipment often takes a partial measurement only and relies upon formula to estimate whole body composition.

Direct Segmental Multi-frequency Bioelectrical Impedance Analysis (DSM-BIA) obtains an impedance measurement for each arm, leg, and the highly sensitive trunk, and is exclusive to In Body technology.

Accurate measurement of trunk impedance determines accuracy.

The human body is composed of five cylinders: the arms, the legs and the trunk. With the technology of the In Body, the trunk is measured directly. The trunk is occupied by various internal organs and its metabolic characteristics are different

from the other parts of the body. It is important to precisely and directly measure the trunk, although difficult, since the trunk has very low resistance compared to the arms and legs.

Resistances of arms and legs are normally between 200~500 Ω while those of body trunks are between 20~30 Ω . Despite its low resistance, the trunk accounts for 50% of total body weight. Essentially, an error of 1~2 Ω in arms or legs has a minimal effect upon final measurement, but a 1~2 Ω error in the trunk will cause major error in the final value for this complex region.

Therefore the overall body composition can be accurately calculated only when the slightest changes in impedance of the trunk can be detected.

Ability to measure an accurate value of the trunk's impedance is In Body's exclusive technology and is vital to providing accurate body composition.

Multi-frequency measurement enables accurate testing.

Electric current has a different penetration force depending on frequency. Low frequencies travel around the body cells and are unable to penetrate the cell wall, thus measuring the water content outside of the cell (the extra cellular space). A higher frequency will measure the water content inside of the cell because it penetrates the cell wall. By using a mixture of frequencies, the In Body can accurately measure water content inside and outside the cell separately.

Also, by using several different frequencies, you are able to provide more information on body composition because more resistance values are obtained. The

InBody720 is based on six different frequencies that measure each segment, providing a total of 30 separate impedance values, thus providing accurate body composition information.

Controlling the path of high frequency waves is very difficult. This technical know-how is an In Body specific specialty and has been accumulated over many years of experience in the field.

8-point tactile electrodes offer high reproducibility.

When measuring impedance through any type of electrode, contact resistance can occur, and it is important to control this contact resistance in order to reduce errors in measurement

In Body uses a unique method of electrode placement. The 8-point tactile method ensures that measurement always starts at exactly the same point each time. This provides high reproducibility and correct body impedance measurement.